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☐ 1. Document ID: US 6862553 B2

L6: Entry 1 of 23   File: USPT   Mar 1, 2005

US-PAT-NO: 6862553
DOCUMENT-IDENTIFIER: US 6862553 B2

TITLE: Diagnostics method and apparatus for use with enterprise controls

DATE-ISSUED: March 1, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schwenke; Marvin J.	Clinton Township	MI		
Sinclair; J. Andrew	Cleveland Heights	OH		
Hoskins; Josiah C.	Austin	TX		
Brooks; Ruven E.	Shorewood	WI		

US-CL-CURRENT: 702/183; 463/24, 700/83, 700/86, 707/102, 717/135

ABSTRACT:

A data construct set and method for use with an industrial process which is
controlled according to execution code wherein a processor running the code
generates requests to mechanical resources to cause the resources to perform the
process, the construct enabling generation of diagnostic code interspersed within
the execution code which, when an event is to occur, indicates the event to occur,
the invention also including status based diagnostics generally and methods of
using the data construct set for generating both execution code and status based
diagnostics.

30 Claims, 129 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 103

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw...

☐ 2. Document ID: US 6819965 B2

L6: Entry 2 of 23   File: USPT   Nov 16, 2004

US-PAT-NO: 6819965
DOCUMENT-IDENTIFIER: US 6819965 B2

** See image for <u>Certificate of Correction</u> **

TITLE: Electronic work instruction <u>object oriented</u> system and method

DATE-ISSUED: November 16, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Beatty; James K.	Jasper	ID		
Thimling; Dennis	Jasper	ID		
Walsh; Terence	Naperville	IL		

US-CL-CURRENT: <u>700/97</u>; <u>700/180</u>, <u>700/83</u>

ABSTRACT:

The present invention involves a method and system for manufacturing documentation for standardizing product manufacturing in an enterprise. The system creates data records representing work instructions, stores the data records in a database and enables the system's users to search the database for specific data records to view, edit, re-use or copy. The data records include process design data having both a fixed (bit-mapped) graphical component and a modifiable (<u>object-oriented</u>) graphical component, and the system enables one group of users to view the fixed graphical component and another group of users to both view and/or modify the modifiable graphical component. In order to maintain control over edits made to data records, the system maintains a log of additions, changes or deletions made to the data records.

41 Claims, 10 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 9

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D |

☐ 3. Document ID: US 6737966 B1

L6: Entry 3 of 23   File: USPT   May 18, 2004

US-PAT-NO: 6737966
DOCUMENT-IDENTIFIER: US 6737966 B1

TITLE: Keypad annunciator graphical user interface

DATE-ISSUED: May 18, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Calder; Dale E.	Mansfield	MA		

US-CL-CURRENT: <u>340/506</u>; <u>340/502</u>, <u>340/503</u>, <u>340/507</u>, <u>340/525</u>, <u>700/17</u>, <u>700/83</u>

ABSTRACT:

A Keypad Annunciator Graphical User Interface, (KAGUI), for use by an operator of a process control system for presenting and responding to alarm state data generated by the process control system, is disclosed. The KAGUI provides an interactive display of a keypad annunciator on a monitor display screen. A panel manager display and a dynamic icon enhance operator awareness, in a multi-window display environment, of alarms. The KAGUI synchronizes alarm data presented by the KAGUI with process control system alarm data and informs the operator of the status of interprocess communication.

19 Claims, 13 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 10

☐ 4. Document ID: US 6643555 B1

US-PAT-NO: 6643555
DOCUMENT-IDENTIFIER: US 6643555 B1

TITLE: Method and apparatus for generating an application for an automation control system

DATE-ISSUED: November 4, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Eller; Thomas	Moerfelden			DE
Peyrou; M. Remi	Frankfurt am Main			DE

US-CL-CURRENT: 700/83; 700/17, 700/18, 700/19, 700/23, 700/86, 700/87, 703/13, 703/14, 703/15, 706/14, 706/21, 706/5, 706/920, 709/220, 709/221, 709/223, 718/106, 718/107

ABSTRACT:

An apparatus and method of generating an application for a control system. A control process is defined by a physical model and a topological model. An application generator utilizes the physical and topological models to generate an application for the control system.

25 Claims, 29 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 29

US-PAT-NO: 6640145
DOCUMENT-IDENTIFIER: US 6640145 B2

TITLE: Media recording device with packet data interface

DATE-ISSUED: October 28, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hoffberg; Steven	West Harrison	NY	10604	
Hoffberg-Borghesani; Linda	Acton	MA	01720	

US-CL-CURRENT: 700/83; 700/17, 700/19, 700/23, 704/200, 704/201, 704/7, 709/200, 709/201, 709/202

ABSTRACT:

An intelligent media device, comprising a packet data communications interface; a media communication interface for receiving audio and/or video data; a digital memory for persistently storing received audio and/or video data; and an intelligent server for generating a virtual interface for controlling the media communication interface and the digital memory through said packet data communications interface. The intelligent server may be adaptive. A variety of devices may be interfaced through the packet data communications interface, including telephony, imaging, videoconferencing, security, alarm, environmental control, vehicular, illumination system, domestic appliance; fluid and handling systems, as well as consumer electronic devices. A digital rights manager for enforcing a set of externally supplied restrictions associated with the received audio and/or video data may be incorporated, with a cryptographic processor for selectively cryptoprocessing audio and/or video data in dependence on said rights manager being provided to limit access to the audio and/or video data content.

23 Claims, 32 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 28

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | | Claims | KWIC | Draw De |

US-PAT-NO: 6571133
DOCUMENT-IDENTIFIER: US 6571133 B1

TITLE: Method for process monitoring, control, and adjustment

DATE-ISSUED: May 27, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mandl; Roland	Ortenburg			DE
Nommer; Johann	Tann			DE
Fuchs; Erich	Salzweg			DE
Sick; Bernhard	Passau			DE

US-CL-CURRENT: 700/18; 700/11, 700/17, 700/83, 715/967

ABSTRACT:

A method, in particular for monitoring, controlling and adjusting a process, wherein a signal processing instruction is synthesized on a computer-assisted user interface by arranging and connecting icons (6, 7), and generated by the computer from base modules containing individual instructions, one base module being allocated to each icon (6, 7), and the individual instructions of the selected base modules being linked to one another according to the graphic integration of the symbols (6, 7) for transmitting and/or processing data.

15 Claims, 3 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 3

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D-

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☐ 7. Document ID: US 6556950 B1

L6: Entry 7 of 23   File: USPT   Apr 29, 2003

US-PAT-NO: 6556950
DOCUMENT-IDENTIFIER: US 6556950 B1

TITLE: Diagnostic method and apparatus for use with enterprise control

DATE-ISSUED: April 29, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schwenke; Marvin J.	Clinton Township	MI		
Sinclair; J. Andrew	Cleveland Heights	OH		
Hoskins; Josiah C.	Austin	TX		
Brooks; Ruven E.	Shorewood	WI		

US-CL-CURRENT: 702/183; 700/83, 700/86, 705/8, 706/52, 707/103R

ABSTRACT:

A data construct set and method for use with an industrial process which is controlled according to execution code wherein a processor running the code generates requests to mechanical resources to cause the resources to perform the process, the construct enabling generation of diagnostic code interspersed within the execution code which, when an event is to occur, indicates the event to occur,

the invention also including status based diagnostics generally and methods of using the data construct set for generating both execution code and status based diagnostics.

15 Claims, 129 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 103

☐ 8. Document ID: US 6546297 B1

US-PAT-NO: 6546297
DOCUMENT-IDENTIFIER: US 6546297 B1

TITLE: Distributed life cycle development tool for controls

DATE-ISSUED: April 8, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gaston; Michael T.	Richmond	VA		
Cook; David	Richmond	VA		
Gandhi; Goutam	Richmond	VA		
Hedrick; Gary D.	Richmond	VA		
Potter; Victor L.	Glen Allen	VA		
Lecheler; Carl J.	Glen Allen	VA		
Matt; Timothy S.	Richmond	VA		

US-CL-CURRENT: 700/83; 700/17, 700/86, 700/97, 715/762, 715/763

ABSTRACT:

A control system for a device, such as an appliance, is designed by storing software representations of pre-existing control panel components (2005) and pre-existing control processes (2010) on a computer, using the computer to develop a control panel for the device by selecting and placing software representations of pre-existing control panel objects in a software representation of the control panel (2015), and using the computer to develop control software for the device by selecting software representations of pre-existing control processes and associating the selected control processes with the selected control panel objects (2020). The control software then is downloaded from the computer to control hardware to be included in the device (2025). Finally, the device is tested using the control software running on the control hardware and under the control of the computer (2030). A system (2100) for designing a control system for a device (2105) includes a computer (2110) having an input unit (2115), an output unit (2120), a processor (2125), a storage device (2130) on which the software representations (2140) are stored, and a display (2135) on which a representation of the control panel is presented. The system also includes control hardware (2145) connected to active components (2150) of the device (2105) and operable to receive data from the output unit (2120) of the computer (2110). The processor (2125) is programmed to

generate the control system in the manner discussed above.

64 Claims, 28 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 27

☐ 9. Document ID: US 6400996 B1

US-PAT-NO: 6400996
DOCUMENT-IDENTIFIER: US 6400996 B1

TITLE: Adaptive pattern recognition based control system and method

DATE-ISSUED: June 4, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hoffberg; Steven M.	West Harrison	NY	10994	
Hoffberg-Borghesani; Linda I.	Acton	MA	01720	

US-CL-CURRENT: 700/83; 370/218, 370/355, 700/17, 700/24, 700/25, 700/86, 700/87, 709/223, 709/227, 715/810, 715/840, 715/841, 718/102, 719/318

ABSTRACT:

An adaptive interface for a programmable system, for predicting a desired user function, based on user history, as well as machine internal status and context. The apparatus receives an input from the user and other data. A predicted input is presented for confirmation by the user, and the predictive mechanism is updated based on this feedback. Also provided is a pattern recognition system for a multimedia device, wherein a user input is matched to a video stream on a conceptual basis, allowing inexact programming of a multimedia device. The system analyzes a data stream for correspondence with a data pattern for processing and storage. The data stream is subjected to adaptive pattern recognition to extract features of interest to provide a highly compressed representation that may be efficiently processed to determine correspondence. Applications of the interface and system include a video cassette recorder (VCR), medical device, vehicle control system, audio device, environmental control system, securities trading terminal, and smart house. The system optionally includes an actuator for effecting the environment of operation, allowing closed-loop feedback operation and automated learning.

25 Claims, 32 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 28

US-PAT-NO: 6366300
DOCUMENT-IDENTIFIER: US 6366300 B1

TITLE: Visual programming method and its system

DATE-ISSUED: April 2, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ohara; Eiji	Tokyo			JP
Suzuki; Midori	Tokyo			JP
Kondo; Shozo	Tokyo			JP
Suetsugu; Nobuhiro	Tokyo			JP
Hagino; Akio	Tokyo			JP

US-CL-CURRENT: 715/771; 700/83, 706/47, 706/59, 715/835, 715/967, 717/113

ABSTRACT:

The user is allowed to automatically generate a program by using a visual
programming method and a system adopting the method for automatically generating a
program wherein an object selection means 8 is used for selecting a behavioral
graphical object defining the behavior of a load connected thereto, a behavior
selection means 9 is used for selecting the type of the behavior of the behavioral
graphical object, a relevant object selection means 10 is used for selecting
relevant graphical objects related to the behavior of the behavioral graphical
object and a behavioral rule setting means 11 is used for setting behavioral rules
of the behavioral graphical object whereas a behavioral characteristic selection
unit 3509 is used for selecting a behavior of a behavioral graphical object
selected by using a behavioral object selection unit 3508, behavioral condition
setting unit 3510 is used for setting conditions for the behavior of the behavioral
graphical object and a relevant object selection unit 3511 is used for defining a
relation.

17 Claims, 69 Drawing figures
Exemplary Claim Number: 9
Number of Drawing Sheets: 46

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | | Claims | KWIC | Draw C |

US-PAT-NO: 6298474
DOCUMENT-IDENTIFIER: US 6298474 B1

TITLE: Method and system for interactively developing a graphical control-flow

structure and associated application software for use in a machine vision system
and computer-readable storage medium having a program for executing the method

DATE-ISSUED: October 2, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Blowers; Andrew	Brighton	MI		
Culik; Jiri G.	Waterford	MI		
Prehn; Steven F.	Dexter	MI		

US-CL-CURRENT: 717/104; 700/83, 700/85, 717/109

ABSTRACT:

A method, a system and a computer-readable storage medium having stored therein a
program for interactively developing a graphical control-flow structure and
associated application software for use in a machine vision system is provided. The
structure is a tree view structure including a control sequence having at least one
node. The method includes providing a first set of control programs representing
possible machine vision tasks. The first set of control programs defines a first
set of standard controls. Hardware operating parameters are provided which
correspond to possible hardware. The hardware operating parameters defining a
second set of standard controls. Graphical representations of possible hardware and
possible machine vision tasks are displayed. Commands are received from a user to
select desired hardware operating parameters corresponding to desired hardware and
a machine vision graphical representation and its associated first control program
corresponding to a desired machine vision task. The tree structure is displayed
wherein the selected machine vision graphical representation is a node of the
structure and the first control program is linked into the structure. A plurality
of separate application processing engines interlinked together are provided for
seamlessly communicating results obtained by execution of the selected first
control program. The selected first control program is linked with the desired
hardware operating parameters to form the application software in response to the
commands without the user writing any of the application software.

24 Claims, 9 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 9

☐ 12.   Document ID: US 6268853 B1

L6: Entry 12 of 23   File: USPT   Jul 31, 2001

US-PAT-NO: 6268853
DOCUMENT-IDENTIFIER: US 6268853 B1

TITLE: Data structure for use in enterprise controls

DATE-ISSUED: July 31, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hoskins; Josiah C.	Austin	TX		
Brooks; Ruven E.	Shorewood	WI		

US-CL-CURRENT: 700/83; 715/764, 715/965

ABSTRACT:

A development tool for use in specifying at least a sub-set of information required to generate control tools for an industrial process wherien the process is performed by mechanical resources, the control tools include execution logic, simulation facilitating tools, diagnostic tools, HMI tools and schematic diagrams, the development tool including a plurality of control assembles (CA), a separate CA for each mechanical resource type, which can be instantiated by selection and parameterization via an editor to specify the required information, after instantiation, the CAs compiled to generate the tools.

33 Claims, 129 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 103

☐ 13. Document ID: US 6243615 B1

US-PAT-NO: 6243615
DOCUMENT-IDENTIFIER: US 6243615 B1

TITLE: System for analyzing and improving pharmaceutical and other capital-intensive manufacturing processes

DATE-ISSUED: June 5, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Neway; Justin O.	Longmont	CO		
Durfee; Steven L.	South Jordan	UT		
Jahn; Gretchen L.	Thornton	CO		

US-CL-CURRENT: 700/108; 700/109, 700/110, 700/17, 700/51, 700/83, 705/11, 705/7, 705/8, 707/102, 707/104.1

ABSTRACT:

A method for displaying a visual process signature for ready visual recognition and communication of otherwise complex manufacturing process information. Process data may be stored in a plurality of data stores, each data store holding a plurality of records containing process data, each record associated with at least one process component. A proxy virtual database is created from copies of records selected from

the data stores. Statistical analysis operations are applied to the selected records within the proxy virtual database to identify process components or combinations of process components having a significant effect on characteristics of a product produced as well as the magnitude of that effect. At least three characteristics of the identified process components including the outcome of the statistical analysis operations are selected and visually displayed in a static or animated three-dimensional representation shown on a two-dimensional display. The visual display indicates the directionality and the extent of the selected characteristics of the selected process components in relation to the selected characteristics of the product produced.

23 Claims, 8 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 6

☐ 14. Document ID: US 6219586 B1

US-PAT-NO: 6219586
DOCUMENT-IDENTIFIER: US 6219586 B1

TITLE: Apparatus and method for managing and distributing design and manufacturing information throughout a sheet metal production facility

DATE-ISSUED: April 17, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sakai; Satoshi	Newport Coast	CA		

US-CL-CURRENT: 700/182; 700/165, 700/169, 700/179, 700/180, 700/206, 700/83, 700/97

ABSTRACT:

An apparatus and method is provided for managing and distributing design and manufacturing information throughout a factory in order to facilitate the production of components, such as bent sheet metal components. In accordance with an aspect of the present invention, the management and distribution of critical design and manufacturing information is achieved by storing and distributing the design and manufacturing information associated with each job. By replacing the traditional paper job set-up or work sheet with, for example, an electronically stored job sheet that can be accessed instantaneously from any location in the factory, the present invention improves the overall efficiency of the factory. In addition, through the various aspects and features of the invention, the organization and accessibility of part information and stored expert knowledge is improved.

12 Claims, 96 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 68

☐ 15. Document ID: US 6212441 B1

L6: Entry 15 of 23   File: USPT   Apr 3, 2001

US-PAT-NO: 6212441
DOCUMENT-IDENTIFIER: US 6212441 B1
** See image for **Certificate of Correction** **

TITLE: Apparatus and method for managing and distributing design and manufacturing information throughout a sheet metal production facility

DATE-ISSUED: April 3, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hazama; Kensuke	Yorba Linda	CA		
Kask; Kalev	Irvine	CA		
Sakai; Satoshi	Newport Coast	CA		
Subbaraman; Anand Heriharan	Santa Ana	CA		

US-CL-CURRENT: 700/98; 345/420, 345/660, 700/118, 700/163, 700/17, 700/182, 700/83, 707/103R, 715/964

ABSTRACT:

An apparatus and method is provided for managing and distributing design and manufacturing information throughout a factory in order to facilitate the production of components, such as bent sheet metal components. In accordance with an aspect of the present invention, the management and distribution of critical design and manufacturing information is achieved by storing and distributing the design and manufacturing information associated with each job. By replacing the traditional paper job set-up or work sheet with, an electronically stored job sheet that can be accessed instantaneously from any location in the factory, the present invention improves the overall efficiency of the factory. In addition, through the various aspects and features of the invention, the organization and accessibility of part information and stored expert knowledge is improved.

77 Claims, 92 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 67

☐ 16. Document ID: US 6185476 B1

L6: Entry 16 of 23   File: USPT   Feb 6, 2001

US-PAT-NO: 6185476

DOCUMENT-IDENTIFIER: US 6185476 B1
** See image for <u>Certificate of Correction</u> **

TITLE: Apparatus and method for managing and distributing design and manufacturing information throughout a sheet metal production facility

DATE-ISSUED: February 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sakai; Satoshi	Newport Coast	CA		

US-CL-CURRENT: <u>700/182</u>; <u>700/145</u>, <u>700/163</u>, <u>700/165</u>, <u>700/179</u>, <u>700/180</u>, <u>700/83</u>, <u>715/964</u>, <u>715/965</u>, <u>715/966</u>, <u>715/967</u>, <u>72/379.2</u>, <u>72/389.1</u>

ABSTRACT:

An apparatus and method is provided for managing and distributing design and manufacturing information throughout a factory in order to facilitate the production of components, such as bent sheet metal components. In accordance with an aspect of the present invention, the management and distribution of critical design and manufacturing information is achieved by storing and distributing the design and manufacturing information associated with each job. By replacing the traditional paper job set-up or work sheet with, for example, an electronically stored job sheet that can be accessed instantaneously from any location in the factory, the present invention improves the overall efficiency of the factory. In addition, through the various aspects and features of the invention, the organization and accessibility of part information and stored expert knowledge is improved.

30 Claims, 96 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 68

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Dr |

□   17.   Document ID: US 6157864 A

L6: Entry 17 of 23   File: USPT   Dec 5, 2000

US-PAT-NO: 6157864
DOCUMENT-IDENTIFIER: US 6157864 A

TITLE: System, method and article of manufacture for displaying an animated, realtime updated control sequence chart

DATE-ISSUED: December 5, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schwenke; Marvin J.	Clinton Township	MI		
Staron; Raymond J.	Richmond Heights	OH		

Sinclair; James A.	Cleveland Heights	OH
Franklin; Paul F.	Akron	OH
Hoskins; Josiah C.	Austin	TX

US-CL-CURRENT: <u>700</u>/<u>79</u>; <u>700</u>/<u>17</u>, <u>700</u>/<u>18</u>, <u>700</u>/<u>83</u>, <u>700</u>/<u>86</u>, <u>700</u>/<u>87</u>

ABSTRACT:

A system software solution for controlling an enterprise which defines and illustrates the electrical, pneumatic, hydraulic, logic, diagnostics, external behavior, controlled resources and safety elements of an enterprise control system. The elements of the control system are encapsulated in objects of an <u>object-oriented</u> framework within a control assembly. The control assembly is the fundamental building block for providing <u>object-oriented</u> control of the enterprise. A control assembly component is a deployable control subsystem that provides an interface using a common object model that is configurable. The enterprise control system is used to define user interfaces including sequence charts that are updated in a substantially realtime manner utilizing the control assemblies associated with the generated code for the enterprise control system.

2 Claims, 86 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 72

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Dr |

☐ 18. Document ID: US 6141595 A

L6: Entry 18 of 23   File: USPT   Oct 31, 2000

US-PAT-NO: 6141595
DOCUMENT-IDENTIFIER: US 6141595 A

TITLE: Common object architecture supporting application-centric building automation systems

DATE-ISSUED: October 31, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gloudeman; Jeffrey J.	Franklin	WI		
Gottschalk; Donald A.	Waukesha	WI		
Kraemer; C. Richard	Waukesha	WI		
Rasmussen; David E.	Dousman	WI		

US-CL-CURRENT: <u>700</u>/<u>83</u>; <u>719</u>/<u>328</u>

ABSTRACT:

An <u>object-oriented</u> building automation system architecture allows complex building automation applications to be developed and deployed as distributed objects across a network. Applications are distributed in the form of objects that may in turn be

made up of other application objects, assembly objects and standard objects. All objects are inherited from a superclass that defines a command component and a view component. The command component identifies those methods within the object that may be executed by other objects, and ultimately by the user through the user interface. The view component identifies the attributes or data stored in the object that may be displayed on the user interface. The view component encapsulates the information needed to display the object's data, so that the user interface can be a generic browser. The standard objects encapsulate physically-constrained properties or human comfort-constrained properties. Applications constructed from these objects can be revised and enhanced more easily because the embedded knowledge is preserved through encapsulation.

3 Claims, 3 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 3

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw C |

☐ 19. Document ID: US 6058333 A

US-PAT-NO: 6058333
DOCUMENT-IDENTIFIER: US 6058333 A

TITLE: Animation of execution history

DATE-ISSUED: May 2, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Klein; Michael T.	Ann Arbor	MI		
Su; William Perry	Ann Arbor	MI		
Mahn; Richard Leroy	Ann Arbor	MI		
Forsgren; Per-Ola Gustav	Solna			SE

US-CL-CURRENT: 700/83; 715/700, 715/970

ABSTRACT:

A digital computer implemented software system is provided which translates a control program into a graphical flow chart and displays the same upon a visual display attached to the digital computer during execution of a control program. The graphical flow chart includes multiple flow paths of execution, each flow path having a respectively associated binary memory location. Each memory location has an initial value of zero, and the value of a particular memory location increases to one upon execution of the control program along the flow path associated with that particular memory location. When a memory location has a value of one, the flow path associated therewith is visually enhanced upon the visually displayed graphical flow chart. A user is provided with a function to reset each memory location value to zero at any time during execution of the control program.

6 Claims, 5 Drawing figures

☐ 20. Document ID: US 5984502 A

L6: Entry 20 of 23   File: USPT   Nov 16, 1999

US-PAT-NO: 5984502
DOCUMENT-IDENTIFIER: US 5984502 A

TITLE: Keypad annunciator graphical user interface

DATE-ISSUED: November 16, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Calder; Dale E.	Mansfield	MA		

US-CL-CURRENT: 700/83; 715/764, 715/866, 715/964

ABSTRACT:

A Keypad Annunciator Graphical User Interface, (KAGUI), for use by an operator of a process control system for presenting and responding to alarm state data generated by the process control system, is disclosed. The KAGUI provides an interactive display of a keypad annunciator on a monitor display screen. A panel manager display and a dynamic icon enhance operator awareness, in a multi-window display environment, of alarms. The KAGUI synchronizes alarm data presented by the KAGUI with process control system alarm data and informs the operator of the status of interprocess communication.

34 Claims, 13 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 10

☐ 21. Document ID: US 5086385 A

L6: Entry 21 of 23   File: USPT   Feb 4, 1992

US-PAT-NO: 5086385
DOCUMENT-IDENTIFIER: US 5086385 A

TITLE: Expandable home automation system

DATE-ISSUED: February 4, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Launey; Reuel O.	Arlington	VA		
Grendler; Peter A.	Silver Spring	MD		
Packham; Donald L.	Fort Lauderdale	FL		
Battaglia; James M.	Kettering	MD		
Levine; Howard E.	Adelphi	MD		

US-CL-CURRENT: 700/83; 340/825.37, 340/825.69, 340/825.72, 379/102.01, 704/270, 704/272, 704/274, 704/275

ABSTRACT:

A system for and a method of providing an expandable home automation controller is disclosed which supports multiple numbers and multiple different types of data communications with both appliances and subsystems within the home as well as systems external to the home. The system is based upon a central processor, such as a microprocessor-based computer, and is connected by means of a data bus to control the various products and subsystems within a home or commercial building, such as lighting systems, security systems, various sensors, multiple external terminals, as well as to allow for the input of commands by a variety of means such as touchscreens, voice recognition systems, telephones, custom switches or any device capable of providing an input to a computer system. The system functions can be readily controlled by the user utilizing a high resolution graphics display and associated touchscreen interface.

20 Claims, 71 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 45

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D |

□ 22. Document ID: US 4914567 A

L6: Entry 22 of 23   File: USPT   Apr 3, 1990

US-PAT-NO: 4914567
DOCUMENT-IDENTIFIER: US 4914567 A

TITLE: Design system using visual language

DATE-ISSUED: April 3, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lipkis; Thomas A.	Topanga	CA		
Mark; William S.	San Carlos	CA		
Pirtle; Melvin W.	Santa Monica	CA		

US-CL-CURRENT: 700/83

ABSTRACT:

A computer-based tool, in the form of a computer system and method, for designing, constructing and interacting with any system containing or comprising concurrent asynchronous processes, such as a factory operation. In the system according to the invention a variety of development and execution tools are supported. The invention features a highly visual user presentation of a control system, including structure, specification, and operation, offering a user an interactive capability for rapid design, modification, and exploration of the operating characteristics of a control system comprising asynchronous processes. The invention captures a representation of the system (RS) that is equivalent to the actual system (AS)-- rather than a simulation of the actual system. This allows the invention to perform tests and modification on RS instead of AS, yet get accurate results. RS and AS are equivalent because AS is generated directly from RS by an automated process. Effectively, pressing a button in the RS environment can "create" the AS version or any selected portion of it, by "downloading" a translation of the RS version that can be executed by a programmable processor in the AS environment. Information can flow both ways between AS and RS. That AS and RS can interact is important. This allows RS to "take on" the "state" of AS whenever desired, through an "uploading" procedure, thereby reflecting accurately the condition of AS at a specific point in time.

15 Claims, 6 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 3

☐ 23. Document ID: US 4570217 A

L6: Entry 23 of 23   File: USPT   Feb 11, 1986

US-PAT-NO: 4570217
DOCUMENT-IDENTIFIER: US 4570217 A

TITLE: Man machine interface

DATE-ISSUED: February 11, 1986

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Allen; Bruce S.	East Kingston	NH	03827	
Dunalvey; Michael R.	Needham	MA	02192	
King; Bruce A.	Bolton	MA	01740	
DuPrie; Harold J.	Andover	MA	01810	
Hudnall; Richard E.	Nashua	NH	03063	
Lapidus; Stanely N.	Bedford	NH	03102	
Gilbert; Daniel R.	Dracut	MA	01826	
Carlson; Anne M.	Wakefield	MA	01880	
Thakrar; Kiran	Salem	NH	03079	
Doig; Robert C.	Salem	NH	03079	
Kimerer; Brian S.	Reading	MA	01867	
Sirois; Andrew F.	Lawrence	MA	01843	

Poirer; Bruce A.	Bradford	MA	01830
Hunt; Philip G.	Derry	NH	03038
Dziezanowski; Joseph J.	Brighton	MA	02146
Bromberg; Michael A.	Nashua	NH	03063
Brown; Michael	Salem	NH	03079
Friedel; Seymour A.	Merrimack	NH	03054

US-CL-CURRENT: 700/83

ABSTRACT:

A man-machine interface for use with industrial processes is disclosed having the capability of design and configuration of the interrelationship of components forming an overall industrial process. The man-machine interface further provides operator use, including process monitoring and control, as well as alarm annunciation. Most user interaction with the man-machine interface is performed through a color CRT monitor having a touch panel on the surface of the CRT screen. Operator use may be limited to touch panel interaction while configurer and designer use normally further includes use of a keyboard.

The man-machine interface utilizes distributed processing and incorporates a high level graphic language. The graphic language facilitates real time graphic display implementation through use of dynamic and static variables. Variable types are dynamically associated with variable values so that variables can undergo type changes without detrimental effect. Video bit bangers and shifters further enhance the versatility and ease of implementing rapid modifications of graphic displays. The man-machine interface further incorporates a new bus structure including a new bus arbitration technique, a unidirectional memory boundary protection mechanism, an improved interrupt system, and an improved watchdog timer circuit.

43 Claims, 119 Drawing figures
Exemplary Claim Number: 35
Number of Drawing Sheets: 105

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Database:

US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L6

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Search History

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	DB=USPT; PLUR=NO; OP=OR		
L6	L5 and (validation or verification)	23	L6
L5	L3 and ((object ADJ oriented) OR (oriented-oriented))	82	L5
L4	L3 AND 717/$$$.ccls.	20	L4
L3	700/83.ccls.	763	L3
L2	('6195591' |'5086385' |'5404288' |'5546301' |'6154680' |'5838563')!.PN.	6	L2
L1	('5940294' |'6195591' |'6445962' |'6442442' |'6185476' |'6405099' |'5486998' |'6327514' |'6212441' |'5568378')!.PN.	10	L1

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☐ 1. Document ID: US 6195591 B1

L2: Entry 1 of 6   File: USPT   Feb 27, 2001

US-PAT-NO: 6195591
DOCUMENT-IDENTIFIER: US 6195591 B1

TITLE: Process control system using a process control strategy distributed among multiple control elements

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 2. Document ID: US 6154680 A

L2: Entry 2 of 6   File: USPT   Nov 28, 2000

US-PAT-NO: 6154680
DOCUMENT-IDENTIFIER: US 6154680 A

TITLE: Control systems and methods utilizing object oriented hardware elements

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 3. Document ID: US 5838563 A

L2: Entry 3 of 6   File: USPT   Nov 17, 1998

US-PAT-NO: 5838563
DOCUMENT-IDENTIFIER: US 5838563 A

TITLE: System for configuring a process control environment

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 4. Document ID: US 5546301 A

L2: Entry 4 of 6   File: USPT   Aug 13, 1996

US-PAT-NO: 5546301
DOCUMENT-IDENTIFIER: US 5546301 A

TITLE: Advanced equipment control system

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐   5.   Document ID: US 5404288 A

L2: Entry 5 of 6   File: USPT   Apr 4, 1995

US-PAT-NO: 5404288
DOCUMENT-IDENTIFIER: US 5404288 A

TITLE: Transfer line control system utilizing distributed computing

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐   6.   Document ID: US 5086385 A

L2: Entry 6 of 6   File: USPT   Feb 4, 1992

US-PAT-NO: 5086385
DOCUMENT-IDENTIFIER: US 5086385 A

TITLE: Expandable home automation system

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

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☐ 1.   Document ID: US 6445962 B1

L1: Entry 1 of 10   File: USPT   Sep 3, 2002

US-PAT-NO: 6445962
DOCUMENT-IDENTIFIER: US 6445962 B1
** See image for Certificate of Correction **

TITLE: Auto-tuning in a distributed process control environment

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 2.   Document ID: US 6442442 B1

L1: Entry 2 of 10   File: USPT   Aug 27, 2002

US-PAT-NO: 6442442
DOCUMENT-IDENTIFIER: US 6442442 B1

TITLE: System level data flow programming interface for a multi-axis industrial
control system

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 3.   Document ID: US 6405099 B1

L1: Entry 3 of 10   File: USPT   Jun 11, 2002

US-PAT-NO: 6405099
DOCUMENT-IDENTIFIER: US 6405099 B1

TITLE: Automatic control system

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 4.   Document ID: US 6327514 B1

L1: Entry 4 of 10   File: USPT   Dec 4, 2001

US-PAT-NO: 6327514
DOCUMENT-IDENTIFIER: US 6327514 B1
** See image for Certificate of Correction **

TITLE: Apparatus and method for managing and distributing design and manufacturing information throughout a sheet metal production facility

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 5.   Document ID: US 6212441 B1

L1: Entry 5 of 10   File: USPT   Apr 3, 2001

US-PAT-NO: 6212441
DOCUMENT-IDENTIFIER: US 6212441 B1
** See image for Certificate of Correction **

TITLE: Apparatus and method for managing and distributing design and manufacturing information throughout a sheet metal production facility

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 6.   Document ID: US 6195591 B1

L1: Entry 6 of 10   File: USPT   Feb 27, 2001

US-PAT-NO: 6195591
DOCUMENT-IDENTIFIER: US 6195591 B1

TITLE: Process control system using a process control strategy distributed among multiple control elements

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 7.   Document ID: US 6185476 B1

L1: Entry 7 of 10   File: USPT   Feb 6, 2001

US-PAT-NO: 6185476
DOCUMENT-IDENTIFIER: US 6185476 B1
** See image for Certificate of Correction **

TITLE: Apparatus and method for managing and distributing design and manufacturing information throughout a sheet metal production facility

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 8.   Document ID: US 5940294 A

L1: Entry 8 of 10   File: USPT   Aug 17, 1999

US-PAT-NO: 5940294
DOCUMENT-IDENTIFIER: US 5940294 A
** See image for Certificate of Correction **

TITLE: System for assisting configuring a process control environment

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 9. Document ID: US 5568378 A

L1: Entry 9 of 10   File: USPT   Oct 22, 1996

US-PAT-NO: 5568378
DOCUMENT-IDENTIFIER: US 5568378 A
** See image for Certificate of Correction **

TITLE: Variable horizon predictor for controlling dead time dominant processes,
multivariable interactive processes, and processes with time variant dynamics

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

☐ 10. Document ID: US 5486998 A

L1: Entry 10 of 10   File: USPT   Jan 23, 1996

US-PAT-NO: 5486998
DOCUMENT-IDENTIFIER: US 5486998 A

TITLE: Process stabilizing process controller

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De |

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